

PCT/IB03/04645 . 03062005

In re: Bowran *et al.*

Inter'l Appl. No.: PCT/IB2003/004645

Amdt. dated 06/03/2005

Amendments to the Claims:

1. (currently amended) A wheat plant comprising ~~at least one a~~ *Triticum aestivum* IMI nucleic acid selected from the group consisting of:

- (a) ~~an Imi1 nucleic acid encoding an IMI polypeptide which comprises a mutation in Domain E that results in a serine to asparagine substitution in the IMI protein as compared to a wild-type AHAS protein; and~~
- (b) ~~an Imi3 nucleic acid encoding an IMI polypeptide which comprises a mutation in Domain E that results in a serine to asparagine substitution in the IMI protein as compared to a wild-type AHAS protein;~~

wherein the *Triticum aestivum* IMI Imi3 nucleic acid confers upon the plant increased tolerance to an imidazolinone herbicide as compared to a wild-type variety of the plant.

2. (cancelled)

3. (cancelled)

4. (currently amended) The wheat plant of claim 1, wherein the plant further comprises a first ~~*Triticum aestivum* IMI nucleic acid and a second *Triticum aestivum* IMI nucleic acid, the first *Triticum aestivum* IMI nucleic acid is the IMI nucleic acid of (a) or (b), and the second *Triticum aestivum* IMI nucleic acid is selected from the group consisting of an Imi1 nucleic acid~~ acid[[,]] and an Imi2 nucleic acid, and an Imi3 nucleic acid.

5. (currently amended) The wheat plant of claim 4, wherein the ~~second~~ *Triticum aestivum* IMI nucleic acid encodes an IMI polypeptide comprising a mutation in a conserved amino acid sequence selected from the group consisting of a Domain A, a Domain B, a Domain C, a Domain D and a Domain E.

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6. (previously presented) The wheat plant of claim 5, wherein the conserved amino acid sequence is a Domain E.

7. (currently amended) The wheat plant of claim 6, wherein the mutation results in a serine to asparagine substitution in the second IMI protein as compared to a wild-type AHAS protein.

8. (currently amended) The wheat plant of claim 1, wherein the ~~at least one *Triticum aestivum* IMI~~ Imi3 nucleic acid comprises a polynucleotide sequence selected from the group consisting of:

- (i) ~~a polynucleotide as defined in SEQ ID NO:1;~~
- (ii) ~~—~~ a polynucleotide as defined in SEQ ID NO:3;
- (iii) ~~—~~ a polynucleotide encoding a polypeptide as defined in SEQ ID NO:2;
- (iv) (ii) a polynucleotide encoding a polypeptide as defined in SEQ ID NO:4;
- (v) (iii) a polynucleotide comprising at least 60 consecutive nucleotides of any of
 - (i) through (iv) (ii) above; and
- (vi) (iv) a polynucleotide complementary to the polynucleotide of any of (i) through (v) (iii) above.

9. (cancelled)

10. (currently amended) The wheat plant of claim 1, wherein the Imi3 nucleic acid comprises a polynucleotide sequence as defined in SEQ ID NO:3.

11. (previously presented) The wheat plant of claim 1, said plant comprising two *Triticum aestivum* IMI nucleic acids.

12. (previously presented) The wheat plant of claim 11, comprising an Imi1 nucleic acid and an Imi3 nucleic acid.

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13. (previously presented) The wheat plant of claim 1, said plant comprising three *Triticum aestivum* [MT] nucleic acids.

14. (previously presented) The wheat plant of claim 1, wherein the plant is not transgenic.

15. (previously presented) The wheat plant of claim 1, wherein the imidazolinone herbicide is selected from the group consisting of 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-nicotinic acid, 2-(4-isopropyl)-4-methyl-5-oxo-2-imidazolin-2-yl)-3-quinolinecarboxylic acid, 5-ethyl-2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-nicotinic acid, 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-5-(methoxymethyl)-nicotinic acid, 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-5-methylnicotinic acid, and a mixture of methyl 6-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-m-toluate and methyl 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-p-toluate.

16. (previously presented) The wheat plant of claim 1, wherein the imidazolinone herbicide is 5-ethyl-2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-nicotinic acid.

17. (previously presented) The wheat plant of claim 1, wherein the imidazolinone herbicide is 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-5-(methoxymethyl)-nicotinic acid.

18. (previously presented) A plant part of the wheat plant of claim 1.

19. (previously presented) A plant cell of the wheat plant of claim 1.

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20. (currently amended) A seed produced by the wheat plant of claim 1, wherein the seed comprises ~~at least one *Triticum aestivum* IMI nucleic acid selected from the group consisting of the *Triticum aestivum* IMI nucleic acids of (a) and (b):~~ the Imi3 nucleic acid.

21. (currently amended) The seed of claim 24, 20, wherein the seed is true breeding for an increased resistance to an imidazolinone herbicide as compared to a wild type variety of the wheat plant seed.

22. (currently amended) A wheat plant comprising the herbicide resistance characteristics of the plant with American Type Culture Collection (ATCC) Patent Deposit Designation Number ~~PTA-4256 or~~ PTA-4257, wherein:

- (a) the wheat plant has an ATCC Patent Deposit Designation Number ~~PTA-4256 or~~ PTA-4257;
- (b) the wheat plant is a recombinant or genetically engineered derivative of the plant with ATCC Patent Deposit Designation Number ~~PTA-4256 or~~ PTA-4257;
- (c) the wheat plant is any progeny of the plant with ATCC Patent Deposit Designation Number ~~PTA-4256 or~~ PTA-4257; or
- (d) the wheat plant is a progeny of any of the plants of (a) through (c).

23. (previously presented) The wheat plant of claim 22, wherein the imidazolinone herbicide is selected from the group consisting of 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-nicotinic acid, 2-(4-isopropyl)-4-methyl-5-oxo-2-imidazolin-2-yl)-3-quinolinecarboxylic acid, 5-ethyl-2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-nicotinic acid, 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-5-(methoxymethyl)-nicotinic acid, 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-5-methylnicotinic acid, and a mixture of methyl 6-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-m-toluate and methyl 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-p-toluate.

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24. (previously presented) The wheat plant of claim 22, wherein the imidazolinone herbicide is 5-ethyl-2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-nicotinic acid.

25. (previously presented) The wheat plant of claim 22, wherein the imidazolinone herbicide is 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-5-(methoxymethyl)-nicotinic acid.

26. (previously presented) A plant part of the wheat plant of claim 22.

27. (previously presented) A plant cell of the wheat plant of claim 22.

28. (currently amended) A triticales plant comprising ~~at least one~~ a *Triticum aestivum* ~~IMI~~ nucleic acid selected from the group consisting of:

- ~~(a) an Imi1 nucleic acid encoding an IMI polypeptide which comprises a mutation in Domain E that results in a serine to asparagine substitution in the IMI protein as compared to a wild-type AHAS protein; and~~
- ~~(b) an Imi3 nucleic acid encoding an IMI polypeptide which comprises a mutation in Domain E that results in a serine to asparagine substitution in the IMI protein as compared to a wild-type AHAS protein;~~

wherein the *Triticum aestivum* ~~IMI~~ Imi3 nucleic acid confers upon the plant increased tolerance to an imidazolinone herbicide as compared to a wild-type variety of the plant.

29. (cancelled)

30. (cancelled)

31. (currently amended) The triticales plant of claim 28, wherein the triticales plant further comprises a first ~~*Triticum aestivum* IMI nucleic acid and a second *Triticum aestivum* IMI nucleic acid, the first *Triticum aestivum* IMI nucleic acid is the IMI nucleic acid of (a) or (b), and~~

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~~the second~~ *Triticum aestivum* IMI nucleic acid is selected from the group consisting of an Imi1 nucleic acid~~[[.]]~~ and an Imi2 nucleic acid~~, and an Imi3 nucleic acid.~~

32. (currently amended) The triticales plant of claim 31, wherein the ~~second~~ *Triticum aestivum* IMI nucleic acid encodes an IMI polypeptide comprising a mutation in a conserved amino acid sequence selected from the group consisting of a Domain A, a Domain B, a Domain C, a Domain D and a Domain E.

33. (previously presented) The triticales plant of claim 32, wherein the conserved amino acid sequence is a Domain E.

34. (currently amended) The triticales plant of claim 33, wherein the mutation results in a serine to asparagine substitution ~~in the second IMI protein~~ as compared to a wild-type AHAS protein.

35. (currently amended) The triticales plant of claim 28, wherein the ~~at least one~~ *Triticum aestivum* IMI Imi3 nucleic acid comprises a polynucleotide sequence selected from the group consisting of:

- (i) ~~a polynucleotide as defined in SEQ ID NO:1;~~
- (ii) ~~a polynucleotide as defined in SEQ ID NO:3;~~
- (iii) ~~a polynucleotide encoding a polypeptide as defined in SEQ ID NO:2;~~
- (iv) (ii) a polynucleotide encoding a polypeptide as defined in SEQ ID NO:4;
- (v) (iii) a polynucleotide comprising at least 60 consecutive nucleotides of any of (i) through (iv) (ii) above; and
- (vi) (iv) a polynucleotide complementary to the polynucleotide of any of (i) through (v) (iii) above.

36. (cancelled)

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37. (previously presented) The tritcale plant of claim 28, wherein the Imi3 nucleic acid comprises a polynucleotide sequence as defined in SEQ ID NO:3.

38. (previously presented) The tritcale plant of claim 28, said plant comprising two *Triticum aestivum* IM1 nucleic acids.

39. (cancelled)

40. (previously presented) A plant part of the tritcale plant of claim 28.

41. (previously presented) A plant cell of the tritcale plant of claim 28.

42. (currently amended) A seed produced by the tritcale plant of claim 28, wherein the seed comprises at least one ~~*Triticum aestivum* IM1 nucleic acid selected from the group consisting of the *Triticum aestivum* IM1 nucleic acids of (a) and (b).~~ the Imi3 nucleic acid.

43. (previously presented) The seed of claim 42, wherein the seed is true breeding for an increased tolerance to an imidazolinone herbicide as compared to a wild type variety of the tritcale plant seed.

44. (currently amended) A tritcale plant comprising the herbicide resistance characteristics of the plant with ATCC Patent Deposit Designation Number ~~PTA-4256~~ or PTA-4257, wherein:

- (a) the tritcale plant is a recombinant or genetically engineered derivative of the plant with ATCC Patent Deposit Designation Number ~~PTA-4256~~ or PTA-4257;
- (b) the tritcale plant is any progeny of the plant with ATCC Patent Deposit Designation Number ~~PTA-4256~~ or PTA-4257; or

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(c) the triticales plant is a progeny of any of the plants of (a) through (b).

45. (currently amended) An isolated IMI nucleic acid, wherein the nucleic acid comprises a polynucleotide selected from the group consisting of:

- (a) ~~a polynucleotide as defined in SEQ ID NO:1;~~
- ~~(b)~~ a polynucleotide as defined in SEQ ID NO:3;
- ~~(c)~~ ~~a polynucleotide encoding a polypeptide as defined in SEQ ID NO:2;~~
- ~~(d)~~ (b) a polynucleotide encoding a polypeptide as defined in SEQ ID NO:4;
- (e) (c) a polynucleotide comprising at least 60 consecutive nucleotides of any of (a) through ~~(d)~~ (b) above; and
- ~~(f)~~ (d) a polynucleotide complementary to the polynucleotide of any of (a) through (e) (c) above.

46. (cancelled)

47. (previously presented) The isolated IMI nucleic acid of claim 45, wherein the nucleic acid comprises a polynucleotide as defined in SEQ ID NO:3.

48. (cancelled)

49. (previously presented) The isolated IMI nucleic acid of claim 45, wherein the nucleic acid comprises a polynucleotide encoding a polypeptide as defined in SEQ ID NO:4.

50. (currently amended) A method of controlling weeds within the vicinity of a plant, comprising applying an imidazolinone herbicide to the weeds and the plant, wherein the plant has increased tolerance to the imidazolinone herbicide as compared to a wild type variety of the plant, and wherein the plant comprises ~~at least one a~~ *Triticum aestivum* IMI nucleic acid selected ~~from the group consisting of:~~

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- (a) ~~an Imi1 nucleic acid encoding an IMI polypeptide which comprises a mutation in Domain E that results in a serine to asparagine substitution in the IMI protein as compared to a wild-type AHAS protein; and~~
- (b) ~~an Imi3 nucleic acid encoding an IMI polypeptide which comprises a mutation in Domain E that results in a serine to asparagine substitution in the IMI protein as compared to a wild-type AHAS protein.~~

51. (currently amended) The method of claim 50, wherein the plant further comprises an Imi1 nucleic acid ~~and an Imi3 nucleic acid.~~

52. (cancelled)

53. (cancelled)

54. (currently amended) The method of claim 50, wherein the ~~at least one *Triticum aestivum* IMI~~ Imi3 nucleic acid is selected from the group consisting of:

- (i) a polynucleotide as defined in SEQ ID NO:3;
- (ii) a polynucleotide encoding a polypeptide as defined in SEQ ID NO:4;
- (iii) a polynucleotide comprising at least 60 consecutive nucleotides of any of (i) through (ii) above; and
- (iv) a polynucleotide complementary to the polynucleotide of any of (i) through (iii) above.

55. (currently amended) A method of modifying a plant's tolerance to an imidazolinone herbicide comprising modifying the expression of ~~at least one a *Triticum aestivum* IMI nucleic acid selected from the group consisting of:~~

- (a) ~~an Imi1 nucleic acid encoding an IMI polypeptide which comprises a mutation in Domain E that results in a serine to asparagine substitution in the IMI protein as compared to a wild-type AHAS protein; and~~

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- (b) — an Imi3 nucleic acid encoding an IMI polypeptide which comprises a mutation in Domain E that results in a serine to asparagine substitution in the IMI protein as compared to a wild-type AHAS protein.

56. (currently amended) The method of claim 55, wherein the plant further comprises an Imi1 nucleic acid ~~and an Imi3 nucleic acid~~.

57. (currently amended) The method of claim 55, wherein the ~~at least one IMI~~ Imi3 nucleic acid is selected from the group consisting of.

- (i) ~~a polynucleotide as defined in SEQ ID NO:1;~~
- (ii) — a polynucleotide as defined in SEQ ID NO:3;
- (iii) — ~~a polynucleotide encoding a polypeptide as defined in SEQ ID NO:2;~~
- (iv) (ii) a polynucleotide encoding a polypeptide as defined in SEQ ID NO:4;
- (v) (iii) a polynucleotide comprising at least 60 consecutive nucleotides of any of (i) through (iv) (ii) above; and
- (vi) (iv) a polynucleotide complementary to the polynucleotide of any of (i) through (v) (iii) above.

58. (new) A seed produced by the wheat plant of claim 22, wherein the seed comprises the herbicide resistance characteristics of the plant with ATCC Patent Deposit Designation Number PTA-4257.

59. (new) The seed of claim 58, wherein the seed is true breeding for an increased resistance to an imidazolinone herbicide as compared to a wild type variety of the wheat plant seed.

60. (new) A seed produced by the triticale plant of claim 44, wherein the seed comprises the herbicide resistance characteristics of the plant with ATCC Patent Deposit Designation Number PTA-4257.

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61. (new) The seed of claim 60, wherein the seed is true breeding for an increased tolerance to an imidazolinone herbicide as compared to a wild type variety of the triticales plant seed.